

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A smoking article comprising:
a tobacco rod having a wrapper formed around the tobacco rod, the wrapper including a patterned deposit on at least a portion of one surface of the wrapper,
wherein the patterned deposit comprises catalyst particles capable of catalyzing, oxidizing and/or reducing the conversion of a constituent gas component in the mainstream and/or sidestream smoke of the smoking article, and
wherein the patterned deposit includes a concentration gradient of the catalyst between a first portion having a low concentration feature and a second portion having a high concentration feature, wherein the first portion and the second portion respectively are a linearly distal portion and a linearly proximate portion of the wrapper with respect to an end of the wrapper.
2. (Previously Presented) The smoking article of claim 1, wherein:
 - (a) the constituent gas component is carbon monoxide and/or nitric oxide;
 - (b) the catalyst is capable of reducing the amount of smoke constituents other than carbon monoxide and nitric oxide;
 - (c) the average particle size of the catalyst is less than about 5 microns or less than about 50 nm;

(d) the catalyst comprises at least one oxide of at least one element selected from the group consisting of B, Al, Si, Ti, Fe, Co, Ni, Cu, Zn, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Sn, Ce, Hf, Ta, W, Re, Os, Jr, Pt and Au;

(e) the catalyst consists essentially of at least one oxide of at least one element selected from the group consisting of B, Al, Si, Ti, Fe, Co, Ni, Cu, Zn, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Sn, Ce, Hf, Ta, W, Re, Os, Jr. Pt and Au;

(f) the deposit is binder-free;

(g) the catalyst comprises iron oxide;

(h) the catalyst comprises FeOOH, Fe₃O₄, α -Fe₂O₃, γ -Fe₂O₃, FeO or mixtures thereof;

(i) the deposit includes a pattern having a plurality of discrete features including an alphanumeric sequence, a pictogram or a geometric shape;

(j) the features of the pattern are repetitive along an axial direction of the smoking article;

(k) the catalyst is deposited on an inner surface of the wrapper;

(l) the catalyst is deposited on an outer surface of the wrapper;

(m) the permeability of the wrapper is no less than 15 CORESTA units;

(n) the areal coverage of catalyst on the wrapper is less than about 90% or less than about 50% of the total surface area of the wrapper;

(o) the areal coverage of catalyst on the wrapper is greater than about 1% or greater than about 5% of the total surface area of the wrapper;

(p) the features of the pattern repeat such that the largest area of uncoated wrapper does not exceed a circular area having a diameter of 1 micron or a diameter of 10 mm;

(q) the total amount of the catalyst is less than about 10 mg/smoking article or less than about 100 mg/smoking article;

(r) the particles are deposited in an amount effective to reduce the concentration in mainstream and/or sidestream smoke of carbon monoxide and/or nitric oxide by at least 10% or by at least 25%; and/or

(s) the catalyst is hydrogen bonded to the wrapper.

3-9. (Cancelled).

10. (Previously Presented) The smoking article of claim 1, wherein:

(a) the catalyst comprises particles of a first oxide supported on particles of a second compound; or

(b) the catalyst comprises particles of a first oxide supported on particles of a second compound, the second compound comprises calcium carbonate.

11-16. (Cancelled).

17. (Previously Presented) The smoking article of claim 1, wherein:

(a) the wrapper is a first wrapper and the smoking article further comprises a second wrapper;

(b) the wrapper is a first wrapper and the smoking article further comprises a second wrapper, the second wrapper is radially outward of the first wrapper;

(c) the wrapper is a first wrapper and the smoking article further comprises a second wrapper, the total amount of catalyst on the second wrapper is zero; or

(d) the wrapper is a first wrapper and the smoking article further comprises a second wrapper, a ratio, in weight percent, of catalyst on the second wrapper to catalyst on the first wrapper is less than 0.25.

18-20. (Cancelled).

21. (Currently Amended) The smoking article of claim 1, wherein:

~~(a) — the wrapper has a linearly distal portion and a linearly proximal portion with respect to a first end of the smoking article, and the linearly distal portion has a first loading of the catalyst and the linearly proximal portion has a second loading of the catalyst or~~

~~(b) — the wrapper has a linearly distal portion and a linearly proximal portion with respect to a first end of the smoking article, and the linearly distal portion has a first loading of the catalyst and the linearly proximal portion has a second loading of the catalyst, the first loading of the catalyst is less than the second loading of the catalyst.~~

22-30. (Cancelled).

31. (Withdrawn) A method of making the smoking article of claim 1, comprising:

(i) depositing catalyst particles on at least a portion of a surface of a wrapper to form a patterned deposit of the particles on the wrapper;

(ii) providing a cut filler comprising tobacco to a cigarette making machine; and

(iii) placing the wrapper including the patterned deposit around the cut filler to form a tobacco rod portion of the smoking article.

32. (Withdrawn) The method of claim 31, wherein:

(a) the catalyst particles are deposited by gravure printing, rotogravure printing, photogravure printing, screen printing, flexographic printing, relief printing, intaglio printing, lithographic printing, spraying, brushing, rolling or size press techniques;

(b) the catalyst particles are deposited in the absence of a binder;

(c) dry catalyst particles are deposited on a base web of the wrapper;

(d) the average particle size of the catalyst particles is less than about 5 microns or less than about 50 nm;

(e) the catalyst particles comprise at least one oxide of at least one element selected from the group consisting of B, Al, Si, Ti, Fe, Co, Ni, Cu, Zn, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Sn, Ce, Hf, Ta, W, Re, Os, Ir, Pt and Au;

(f) the catalyst particles comprise iron oxide;

(g) the catalyst particles comprise FeOOH, Fe₃O₄, α-Fe₂O₃, γ-Fe₂O₃, FeO or mixtures thereof;

(h) the patterned deposit includes a plurality of discrete features including an alphanumeric sequence, a pictogram or a geometric shape;

- (i) the patterned deposit includes a concentration gradient of the catalyst particles between a first portion having a low concentration feature and a second portion having a high concentration feature;
- (j) the catalyst particles are deposited on an inner surface of the wrapper;
- (k) the catalyst particles are deposited on an outer surface of the wrapper;
- (l) the permeability of the wrapper is no less than 15 CORESTA units;
- (m) the areal coverage of catalyst on the wrapper is less than about 90% or less than about 50% of the total surface area of the wrapper;
- (n) the areal coverage of catalyst on the wrapper is greater than about 1% or greater than about 5% of the total surface area of the wrapper;
- (o) the features of the pattern repeat such that the largest area of uncoated wrapper does not exceed a circular area having a diameter of 1 micron or a diameter of 10 mm;
- (p) the total amount of the catalyst is less than about 10 mg/smoking article or less than about 100 mg/smoking article;
- (q) the particles are deposited in an amount effective to reduce the concentration in mainstream and/or sidestream smoke of carbon monoxide and/or nitric oxide by at least 10% or by at least 25%; and/or
- (r) the catalyst is hydrogen bonded to the wrapper.

33-34. (Cancelled).

35. (Withdrawn) The method of claim 31, wherein:

(a) the catalyst particles are deposited by dispersing the particles in a liquid to form a mixture and depositing the mixture on the wrapper; or

(b) the catalyst particles are deposited by dispersing the particles in a liquid to form a mixture and depositing the mixture on the wrapper, the liquid comprises alcohol, water and/or other solvents and mixtures thereof.

36. (Cancelled).

37. (Withdrawn) The method of claim 35, further comprising drying the patterned deposit by heating the wrapper.

38. (Cancelled).

39. (Withdrawn) The method of claim 31, wherein the wrapper is a first wrapper and the method further comprises:

(iv) placing a second wrapper around the tobacco rod portion.

40. (Withdrawn) The method of claim 39, wherein:

(a) the second wrapper is radially outward from the first wrapper;

(b) the total amount of catalyst particles on the second wrapper is zero;

and/or

(c) a ratio, in weight percent, of catalyst particles on the second wrapper to catalyst particles on the first wrapper is less than 0.25.

41-46. (Cancelled).

47. (Withdrawn) The method of claim 31, wherein:

(a) the catalyst particles comprise particles of a first oxide supported on particles of a second compound; or

(b) the catalyst particles comprise particles of a first oxide supported on particles of a second compound, the second compound comprises calcium carbonate.

48-52. (Cancelled).

53. (Withdrawn) The method of claim 31, wherein:

(a) the wrapper has a linearly distal portion and a linearly proximal portion with respect to a first end of the smoking article, and the linearly distal portion has a first loading of the catalyst particles and the linearly proximal portion has a second loading of the catalyst particles; and/or

(b) the first loading of the catalyst particles is less than the second loading of the catalyst particles.

54-61. (Cancelled).

62. (Withdrawn) A wrapper for a smoking article, the wrapper comprising:
a web; and

a patterned deposit on at least a portion of one surface of the web, wherein the patterned deposit comprises catalyst particles,

wherein the patterned deposit includes a concentration gradient of the catalyst between a first portion having a low concentration feature and a second portion having a high concentration feature.

63. (Withdrawn) A sheet of cigarette wrapping paper comprising a plurality of the wrappers of claim 62.

64. (Withdrawn) The wrapper of claim 62, wherein:

- (a) the average particle size of the catalyst is less than about 5 microns or less than about 50 nm;
- (b) the catalyst comprises iron oxide;
- (c) the catalyst comprises particles of a first oxide supported on particles of a second compound;
- (d) the deposit includes a pattern having a plurality of discrete features including an alphanumeric sequence, a pictogram or a geometric shape;
- (e) the permeability of the wrapper is no less than 15 CORESTA units;
- (f) the areal coverage of catalyst on the wrapper is less than about 90% or less than about 50% of the total surface area of the wrapper;
- (g) the areal coverage of catalyst on the wrapper is greater than about 1% or greater than about 5% of the total surface area of the wrapper; and/or

(h) the features of the pattern repeat such that the largest area of uncoated wrapper does not exceed a circular area having a diameter of 1 micron or a diameter of 10 mm.

65-72. (Cancelled).

73. (Withdrawn) A method of manufacturing the wrapper of claim 62, wherein the wrapper is cigarette paper with a patterned deposit of catalyst particles, the method comprising:

- (i) forming a sheet of cigarette paper in a papermaking machine;
- and
- (ii) depositing catalyst particles on at least a portion of a surface of the paper to form a patterned deposit of the particles on the paper.

74. (Withdrawn) The method of claim 73, wherein:

- (a) the catalyst particles are deposited by gravure printing, rotogravure printing, photogravure printing, screen printing, flexographic printing, relief printing, intaglio printing, lithographic printing, spraying, brushing, rolling or size press techniques;
- (b) the catalyst particles are deposited in the absence of a binder;
- (c) the average particle size of the catalyst particles is less than about 5 microns or less than about 50 nm;
- (d) the catalyst particles comprise iron oxide; and/or

(e) the patterned deposit includes a plurality of discrete features including an alphanumeric sequence, a pictogram or a geometric shape.

75 - 78.(Cancelled).

79. (Withdrawn) A catalytic ink utilized in production of a wrapper for a smoking article, the catalytic ink comprising:

a liquid; and

a nanoparticle catalyst suspended in the liquid.

80. (Withdrawn) The catalytic ink of claim 79, wherein the ink consists essentially of:

a liquid; and

a nanoparticle catalyst suspended in the liquid.

81. (Withdrawn) The catalytic ink of Claim 80, wherein the ink is binder-free.